



# **Sun 4300 CPU Board**

## **Installation Manual**







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## **WARNING**

On the Sun 4300 CPU board, there is a Lithium Battery molded into the Mostek real-time clock, No. MK48T02BU-25 or MK48T02B-XX, where X may be any number between 0-9.

Batteries are NOT customer-replaceable parts. They may explode if mistreated. Do not dispose of the battery in fire. Do not disassemble it or attempt to recharge it.



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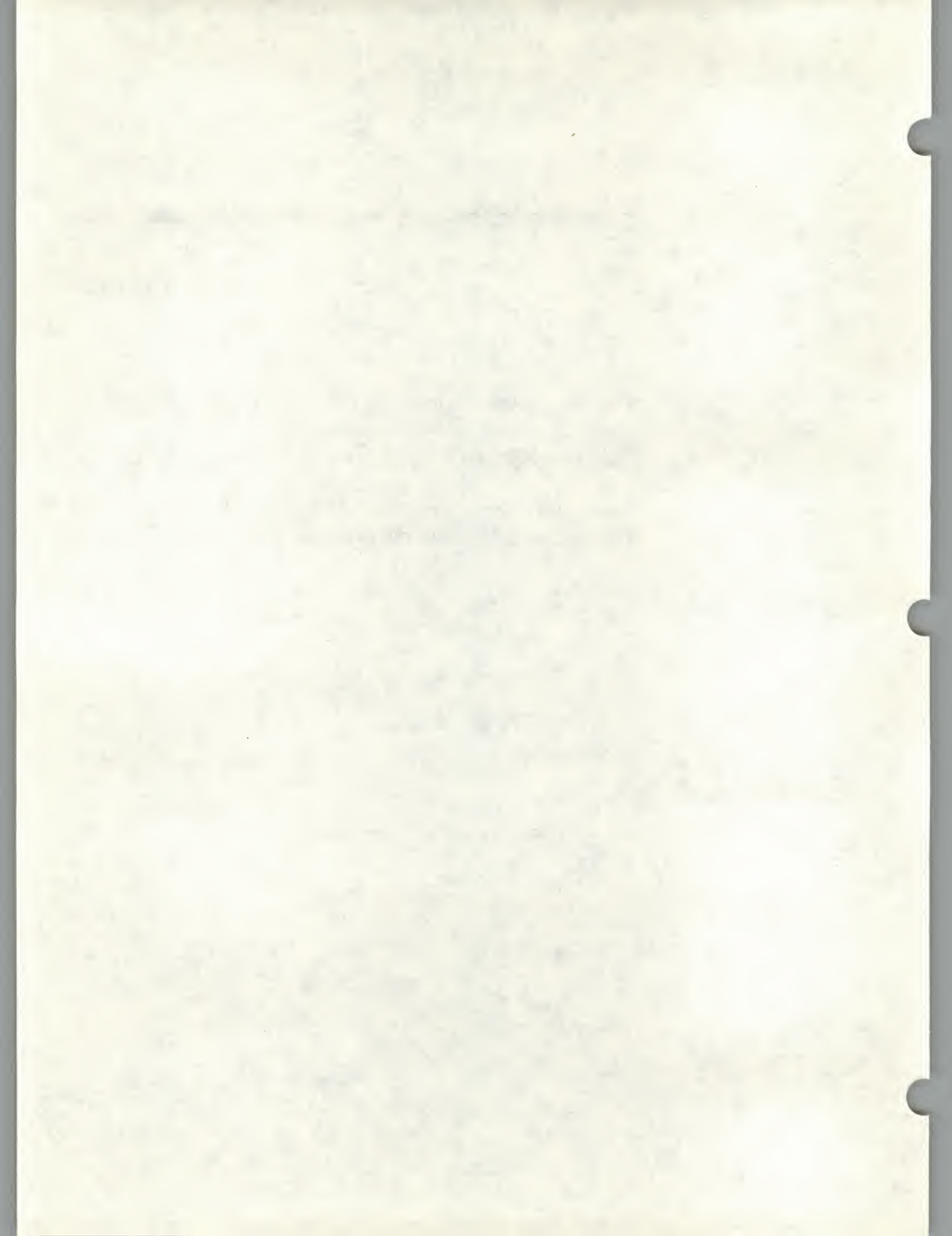




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## Preface

This manual provides remove and replacement instructions for the Sun 4300 CPU Board in an installed workstation. It also provides installation and cabling instructions for the Sun 4300 CPU in a new workstation.

For information on unpacking and setting up the logic enclosure, connecting the monitor, and accessing the backplane, refer to the logic enclosure installation manual.

### Summary of Contents

This manual contains the following information:

#### Chapter 1

*General Description* — provides an overview of the CPU board features.

#### Chapter 2

*Board Installation and Extraction* — provides information for extracting and installing a replacement CPU board.

#### Chapter 3

*Cabling* — explains how to connect the keyboard and mouse, Ethernet, and SCSI devices to the CPU board edge connectors. It also provides guidelines for connecting peripheral devices to the serial ports.

#### Chapter 4

*Power-Up and Self-Test* — describes the function of CPU board switches and LED, and briefly describes normal and diagnostic boot-ups.

#### Appendix A

*CPU Board Connector Pin Assignments and Serial Port Signals* — provides pin assignments for each connector on the CPU board edge.

#### Appendix B

*Customer Service Repairs* — gives procedures for removing specific components before sending the CPU board to Sun Customer Service for repair.

#### Appendix C

*Power Consumption Table* — lists the amount of power consumed by the CPU in different configurations.

#### Appendix D

*Jumper Configurations for the 4300 CPU Board* — provides descriptions, locations, and default configurations for each jumper on the 4300 CPU board. It also provides the board layout so that you can easily locate the jumper blocks and important components.



Finally, you will find a record of revisions to this manual and a *Reader Comment Sheet* at the back of this document. Please fill out the Reader Comment Sheet and return it to Sun Microsystems so that we can maintain the accuracy and usefulness of this document. Your comments are greatly appreciated.

### **Applicable Documents**

We would like to emphasize that this manual outlines rather than exhausts many of the topics contained within. References to applicable documents are listed below, and we urge you to read these documents should you need further information.

Sun System Overview Manual

Sun Board Installation Manual

Logic Enclosure Installation Manual

Sun Hardware Options Guide

Sun Release 4.0 Docubox

Beginner's Guides

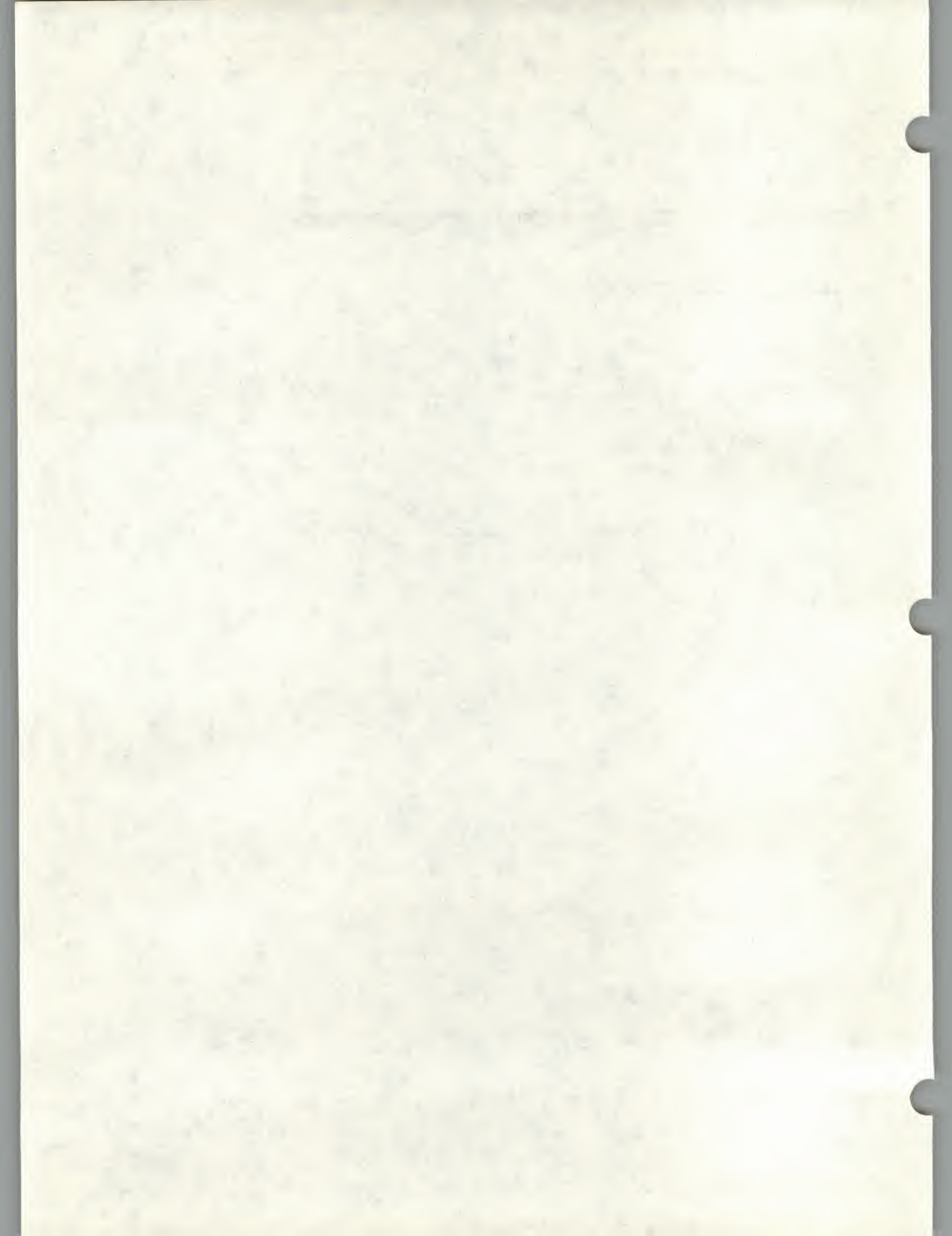
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## General Description

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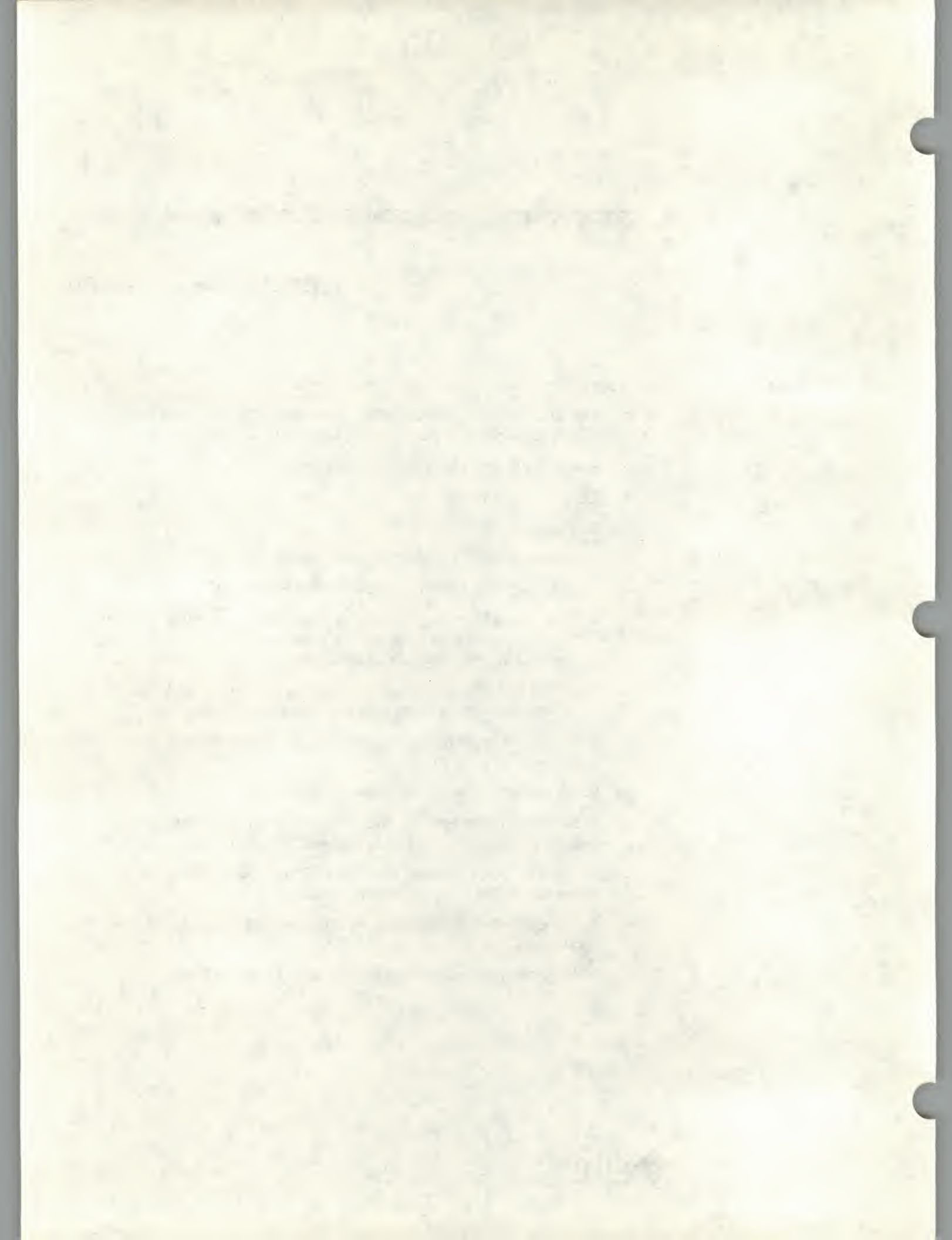
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## General Description

### 1.1. CPU Board

Basic features of the CPU board are listed below:

- The Sun-4 Reduced Instruction Set Computer (RISC) based on Sun's Scalable Processor Architecture (SPARC) operating at a speed of 25 MHz.
- 8 Mbytes of parity-checked SIMM memory.
- Revision C.1 VME interface.
- Ethernet.
- Synchronous Small Computer Systems Interface (SCSI).
- The Memory Control section of the board, consisting of:
  - \* The Sun-4 Memory Management Unit (MMU), providing virtual-to-physical translation for up to 16 contexts, with each context allowing up to one Gigabyte of virtual address space.
  - \* The 128 Kbyte direct-mapped, virtual address, write-through cache. Cache operation is transparent to application programs.
- Interface circuitry that supports the keyboard, mouse, and four serial ports operating at up to 19.2 kbps.
- Sun standard CPU board size of 9U X 400 mm.
- TI ACT8847 64-bit Floating Point Processor that runs at CPU speed and is controlled by the Floating Point Controller (FPC) chip.
- An optional Data Ciphering Protocol (DCP) processor chip set provides added security by encrypting network data.
- P4 bus graphics options, such as the MG4 monochrome and CG6 2-D accelerators.
- VME graphics options such as the GP2 and CG9 frame buffers.





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## Board Installation and Extraction

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## Board Installation and Extraction

This chapter describes how to extract and install a replacement CPU board. When installing a new workstation or moving an installed workstation to a new location, skip the following board installation procedures and begin with Chapter 3, which deals with connecting the cables to the CPU board.

If you are replacing an existing CPU board, read the cautions and procedures that follow.

**CAUTION** To reduce the risk of electric shock and/or fire hazard, refer all servicing to qualified service personnel.

### 2.1. Prerequisite for Installs or Removals

To complete the installation, you will need the following:

- A 2 mm Allen (hex) wrench to secure the CPU board in the cardcage.
- A small flat-blade screwdriver for the screws that secure the cables to the CPU board.
- Fine-tipped needle-nose pliers to remove/install CPU board jumpers.
- An anti-static wrist strap. This strap should be attached to a ground location whenever you handle the boards. This prevents damage to the components, which are sensitive to electrostatic discharge.
- A #1 Phillips screwdriver to remove the screws that secure the backplane access panel. This will enable you to check backplane jumpers.

**CAUTION** Before installing these boards, make sure that the host system is powered down. The system administrator should have warned clients or other users that the system is about to be powered down, and then used a command such as `/etc/halt` or `/etc/fasthalt`. This procedure ensures that any data in the buffers is written to disk before SunOS is halted.



## 2.2. Springfinger Warning

Springfingers are metal strips that are installed between the edge of the PC board and the outer panel to reduce RFI emissions. Serrated metal "fingers" protrude from either side of the strip.

Installation of a board **WITHOUT** springfingers may affect RFI emissions and may therefore affect FCC compliance. Sun is not responsible for FCC compliance if non-springfingered boards are added to a system originally shipped **WITH** springfingers and FCC approval.

If a board **WITH** springfingers is installed next to a board **WITHOUT** springfingers, the insulator shield on the outside of the fingers **MUST** be present to prevent possible shorting of component leads to the springfingers.

If a logic enclosure contains boards **WITH** and **WITHOUT** springfingers, use the following guidelines:

- **Before removing a board WITHOUT springfingers, remove the board next to it if that board is equipped WITH springfingers and an outer insulator shield.**
- **Always install a board WITHOUT springfingers first, and then replace the board WITH springfingers and insulator shield in the slot next to it.**
- **Replace any filler panel equipped WITH springfingers by pushing both units into place simultaneously and fasten with the appropriate fasteners. This procedure makes replacement of the filler panels easier, and reduces the chance of damage to the springfingers.**

If a board **WITH** springfingers is installed next to a board or filler panel also equipped **WITH** springfingers, the outside insulator shields should be removed.

Ensure that the insulator strip between the inner side of the springfingers and the PC board is intact at all times.

When removing and replacing boards with springfingers, check the condition of the insulator strip/shield(s) and replace if damaged. For information on how to obtain additional insulator strips or shields, call your nearest Sun Representative.



### 2.3. Boards Shipped Separately

This section applies only to boards that are shipped separately. If you are installing a new Sun workstation (one that already has a Sun 4300 CPU and possibly a memory board in it), read the installation manual that comes with the logic enclosure, then proceed to Appendix D, "Jumper Configurations for the 4300 CPU Board" for board configuration information.

Also note the following:

1. When you receive your boards, *immediately* inspect the shipping containers for evidence of damage. If the carrier's agent is not present when a container is opened and the contents are found to be damaged, keep all contents and packing materials for the agent's inspection.
2. If there is no evidence of damage, carefully remove the boards from the shipping container. Save the carton and the packing material for later use.
3. Inspect the boards for any socketed parts that may have worked loose during shipment. Place the board on a flat surface, and firmly seat any loose components in the sockets.

### Handling Boards and Components

Printed circuit boards contain components sensitive to damage from electrostatic discharge (ESD) that may occur, for example, when you walk across a carpet and then touch the board. Before handling a board, place your hand on a conductive surface that is grounded to a common earth ground (such as a metal screw or an unpainted metal plate on the AC wall receptacle) to discharge any static electricity from your body.

To minimize the risk of ESD damage, handle the board only by its edges, and store the board in the anti-static bag provided. If you work on the board for longer periods of time, use appropriate grounding devices, such as an anti-static wrist strap.

Components are fragile and should be handled with care to avoid damage. When reseating chips, ensure that the pins are aligned with the holes in the board, then gently push down on the center of the chip. Also ensure that the dot or "v-shaped" notch on the chip is aligned with the "v" printed on the board.

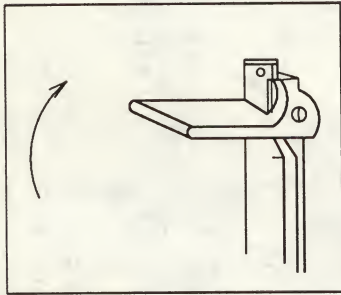
### Special Note on Modified Boards

If you are installing a replacement 4300 CPU board, the ID PROM and any chips purchased as an upgrade need to be removed prior to sending the board to Customer Service. The removed components are replaced with upgrades before the CPU board is reinstalled. Refer to Appendix B, *Customer Service Repairs*, for step-by-step instructions on how to replace the components.

**NOTE** *The ID PROM contains the workstation's unique Ethernet address and serial number, so it must stay with the workstation.*



## 2.4. To Install or Extract the Boards



Extraction Lever

### For replacement boards:

Verify that the boards are correctly configured as shown in Appendix D, "Jumper Configurations for the 4300 CPU Board."

1. Power down the system by first moving to the root (super user) level on the system. Next, either you or the system administrator should warn clients or other users that the system is about to be powered down. Then, enter the following commands:

```
# sync
# sync
# /etc/halt or
# /etc/shutdown
```

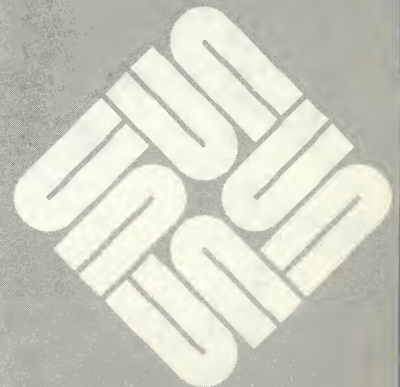
2. Disconnect all cables from the existing CPU board.
3. Unfasten the recessed hex-head screws, and use the extraction levers to release the board. Carefully slide the board out.
4. Install the new board in the cardcage. The board should slide into the cardcage slot with little resistance and fit snugly when seated into the backplane connectors. If the board does not insert and seat easily, inspect the cardcage slot for any obvious obstructions and inspect both the board and the backplane for damage (bent connector pins, springfingers, etc.).
5. After the boards are seated firmly in the correct slots, replace and tighten their backpanel screws. *The boards may not function properly if these screws are not tightened.*

For information on where to place multiple memory boards or other options, refer to the *Cardcage Slot Assignment and Backplane Configuration Procedures* manual for the system.



## Cabling

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## Cabling

This chapter describes how to connect cables from the following devices to the connectors on the edge of the CPU board:

- Keyboard/Mouse
- Ethernet Transceiver
- Internal/External SCSI Devices
- Serial Ports
- Printers
- Modems
- Terminals

Monitor cabling is described in the logic enclosure installation manual. You should refer to that manual after you have completed the cabling described in this chapter. Additional information about the Ethernet is also provided in the logic enclosure installation manual.

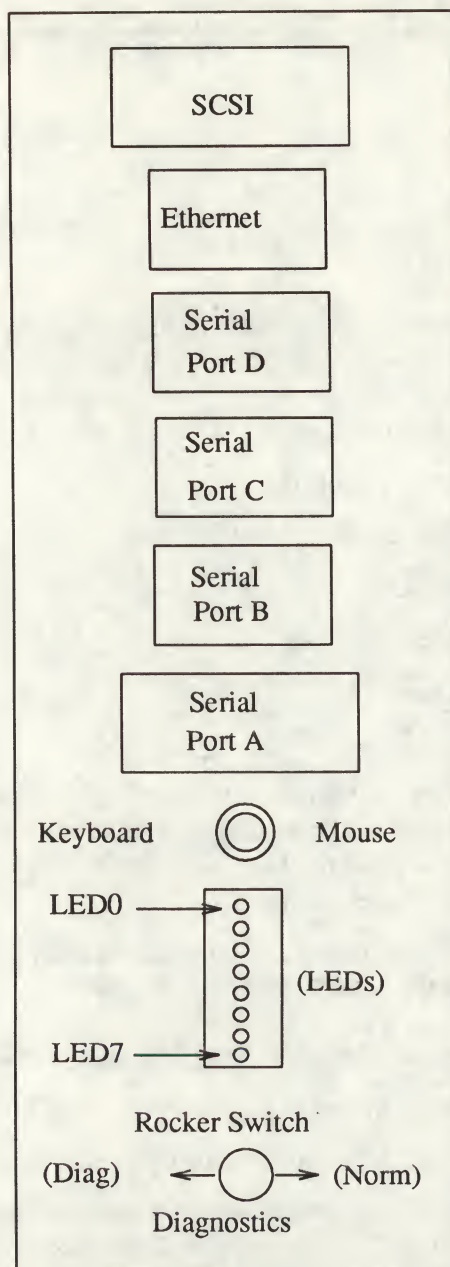
Appendix A provides the signal names and pin number arrangement for the connectors at the back of the workstation.

**CAUTION** Before attempting any of the following connections, make certain that:

1. The power to the logic enclosure is OFF.
2. The AC power cord is unplugged from the wall.

The following illustration shows the location of CPU board connectors when the board is in a vertical position, with the component side on the right.

Figure 3-1 *Sun 4300 CPU Board Edge Connectors*





### 3.1. Keyboard and Mouse Connections

The keyboard cable is shipped with the system keyboard. To connect the keyboard and mouse to your system, perform the following:

1. Plug one end of the keyboard cable into the 8-pin DIN connector labeled "keyboard" on the CPU.
2. Plug the other end of the keyboard cable into one of the connectors located underneath the keyboard. One connector is for the keyboard, and the other will be used for the mouse. Either connector may be used.
3. Plug the mouse cable into the unused 8-pin DIN connector on the keyboard.

### 3.2. Connecting the Ethernet Transceiver Cable

If you are going to connect your system to an Ethernet, you need to connect the transceiver (drop) cable as described below:

1. Plug the male end of the Ethernet cable into the "ETHERNET" connector on the CPU board. This male end has a pair of metal studs that fit into the Ethernet connector's slide lock assembly.
2. The female end of the cable has the slide lock assembly attached to it. Push the slide lock over the studs to fasten the D connector securely in place.

Refer to the logic enclosure installation manual for additional information on Ethernet coaxial cable installation.

### 3.3. SCSI Connection for Internal Devices

If you have optional internal peripherals with the system, there will be a D-shaped 50-pin cable connecting the SCSI connector on the rear panel of the CPU to the peripherals in the unit.

### SCSI Connection to External Devices

If you are adding an external SCSI device, you will need to read the appropriate section in the logic enclosure installation manual.

### 3.4. Serial Ports

The serial ports on the Sun 4300 CPU board can be used to connect RS-232/RS-423 peripherals to your system and can drive these output lines at speeds up to 19.2 kilobaud. You may attach modems, printers, and plotters (or other serial devices that use the RS-232-C or RS-423 interface) to the serial port connectors labeled "SERIAL PORT A," "SERIAL PORT B," "SERIAL PORT C," and "SERIAL PORT D" on the CPU board backpanel.

Serial port A provides a 25-pin connector (DB-25) compatible with RS-232-C equipment. All signals in the connector are semantically the same as their RS-232-C counterparts. The 4300 CPU board uses improved electrical circuits which, while working with RS-232-C devices, are also compatible with the newer RS-423 standard. Serial ports B, C, and D provide a 9-pin connector (DB-9) for connecting to certain serial devices.

All ports provide the following signals: DTR (Data Transmit Ready), RTS (Request To Send), DSR (Data Set Ready), CTS (Clear To Send), and DCD (Data Carrier Detect). Only Serial Port A provides clock signals, allowing it to be used in synchronous communication. The DTR and RTS signals may be inhibited through EEPROM programming as described in the *SunOS Reference Manual*.

Serial port A is wired as Data Terminal Equipment (DTE) ports, which means Transmit Data from the workstation is on pin 2 and Receive Data from the peripheral is on pin 3. Serial ports B, C, and D follow the convention established with personal computers.

Signals carried on the SERIAL PORT A, SERIAL PORT B, SERIAL PORT C, and SERIAL PORT D are described in Appendix A.



Figure 3-2 25-Pin Connector Signals for Port A

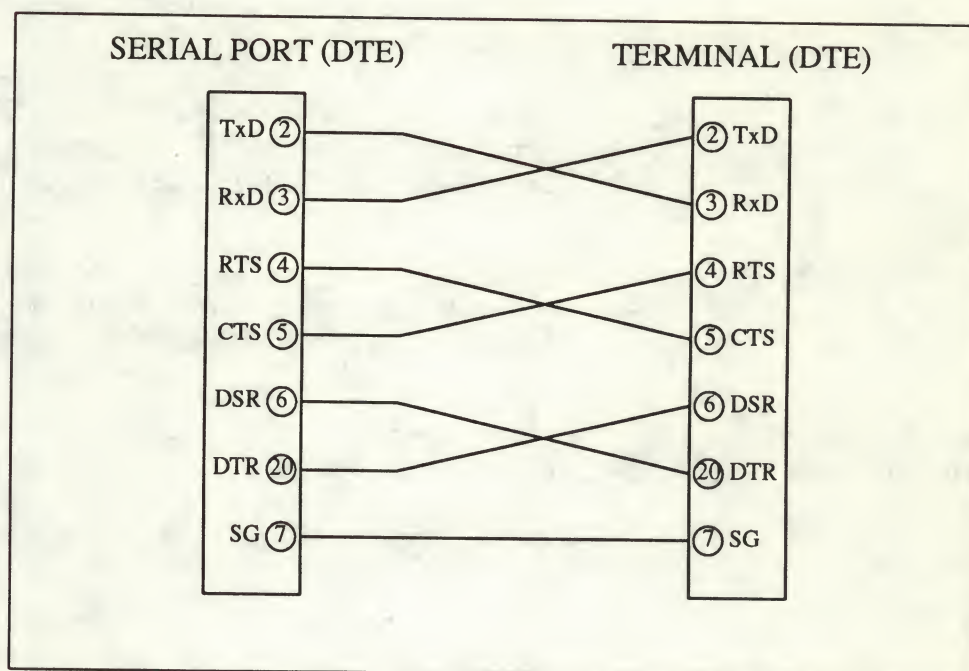
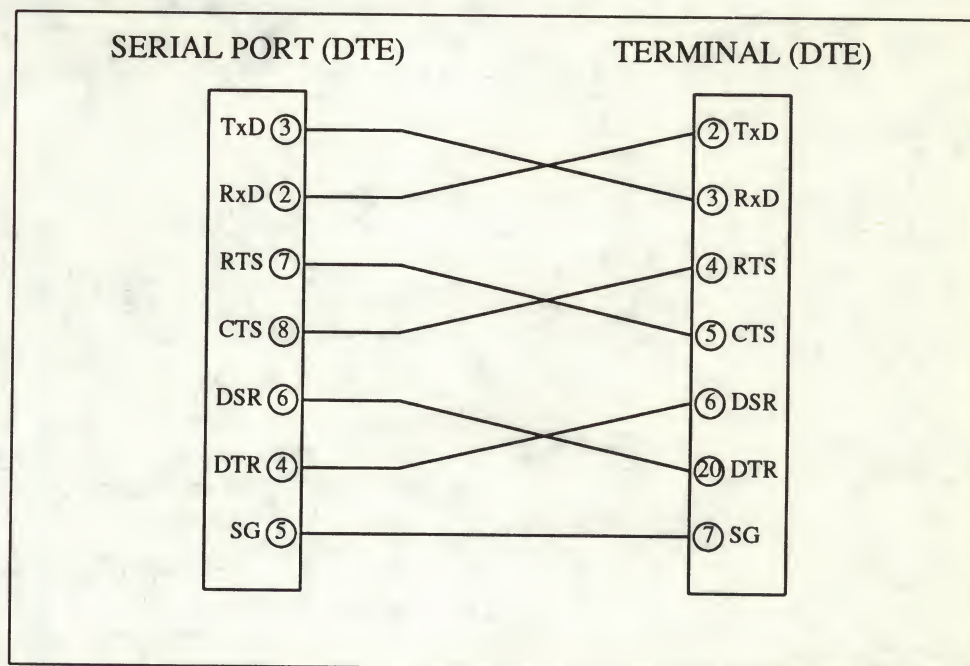


Figure 3-3 9-Pin Connector Signals for Ports B, C, and D





Refer to the manual that comes with your terminal to make certain that the signals needed to operate the terminal are provided at the correct pins of the serial port. Refer also to the *Sun System Administration* manual for more information on terminal connection.

**NOTE** *You may change the baud rate or disable the DTR and RTS signals on the CPU board by changing certain EEPROM parameters using the eeprom command as described in the SunOS Reference Manual.*

### 3.5. Connecting a Printer, Modem, or Terminal

The following procedures are guidelines to help you connect peripherals to the serial ports. Specific devices may require more detailed information such as that contained in the *SunOS Interface Reference Manual*.

#### Connecting a Printer to the Sun CPU Board

The serial ports on the CPU board are wired as Data Terminal Equipment (DTE) ports, as are most printers. To connect a serial printer to the Sun CPU board, first determine whether the printer uses the RS-232-C standard (most serial printers use this standard). Then use a null modem cable to connect the printer to the appropriate serial port on the CPU board.

To connect a parallel interface printer to a Sun CPU board, you must use a serial-to-parallel converter. First connect the serial-to-parallel converter to the printer, then connect one end of a null modem cable to the converter and connect the other end of the null modem cable to the appropriate serial port on the CPU board.

Refer to the manual that comes with your printer to make certain that the signals needed to operate the printer are provided at the correct pins of the serial port. Refer also to *System and Network Administration* for more information about printer connection.

#### Connecting a Modem to the Sun CPU Board

The serial ports are wired as Data Terminal Equipment (DTE) ports and most modems are wired as Data Communications Equipment (DCE). The cable connecting your modem to the CPU board should be "straight through." This means that the signals on pins 2, 3, 4, 5, 6, 7, 8, and 20 at the output of the cable should be the same as those signals on corresponding pins of the serial port.

During a normal boot-up, the serial ports come up at 9600 baud with 8 data bits, 1 stop bit, and no parity. (During a diagnostic boot-up, Serial Port B comes up at 1200 baud while Ports A, C, and D come up at 9600 baud.) You can change the baud rate through EEPROM programming as described in the *SunOS Reference Manual*.

Refer to the manual that comes with your modem to see which signals you will need for proper operation of your modem. Refer also to *System and Network Administration* and the *SunOS Interface Reference Manual* for more information about modem connection.

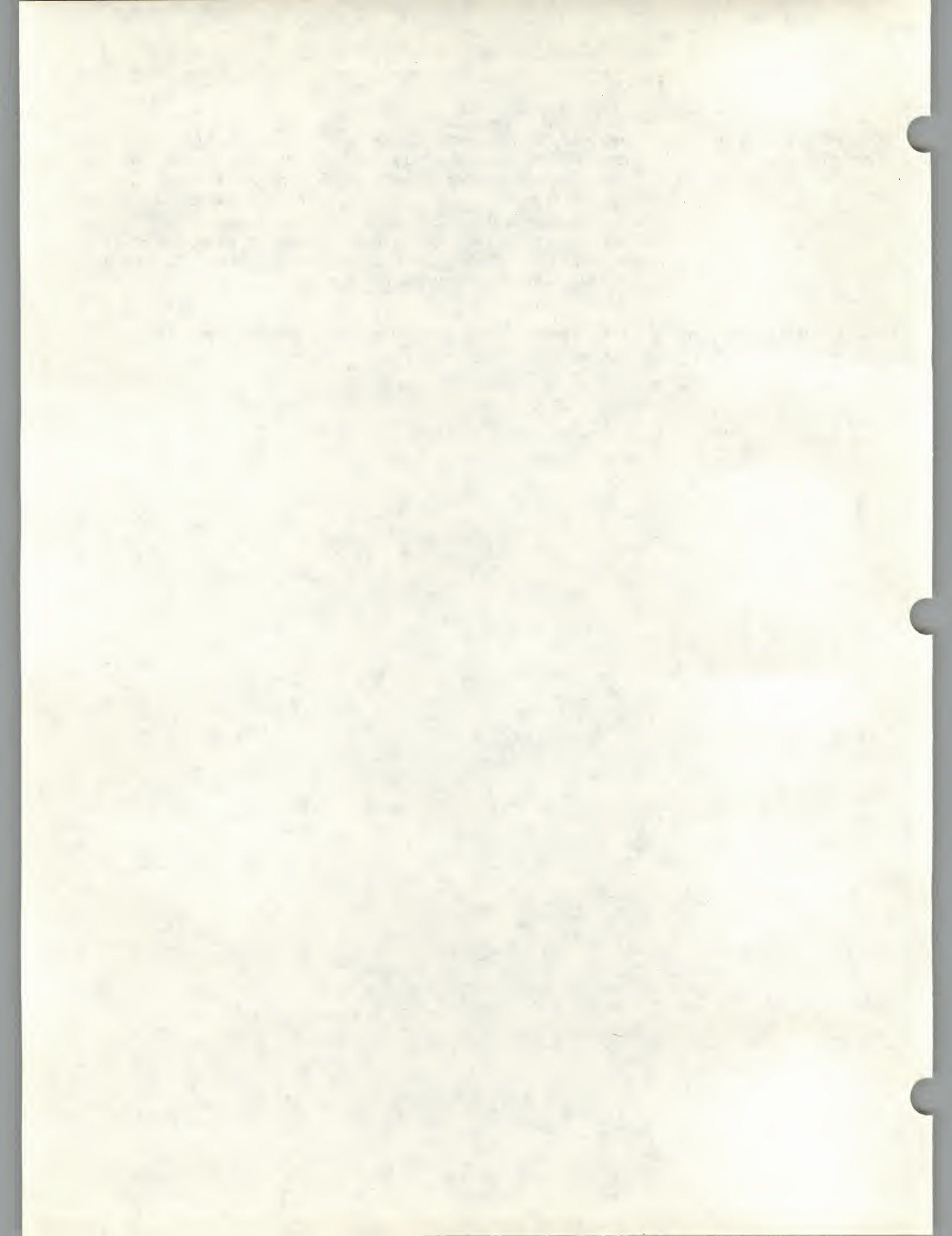


### Connecting a Terminal to the Sun CPU Board

The serial ports are wired as Data Terminal Equipment (DTE) ports, as are most terminals. To connect a terminal to a serial port, you must first make certain that the terminal you are using accepts the RS-232-C or RS-423 protocol. If the terminal conforms to one of these protocols, you may then connect it to any of the serial ports with a null modem cable. (The 25-pin connector on the left in Figure 3-2 is serial I/O port A on the CPU board; the connector on the right is the terminal DTE). Figure 3-3 shows the 9-pin connector for serial ports B, C, and D on the left, and the terminal connector on the right.

### 3.6. Monitor Connection

Refer to the logic enclosure installation manual for instructions on cabling your monitor.



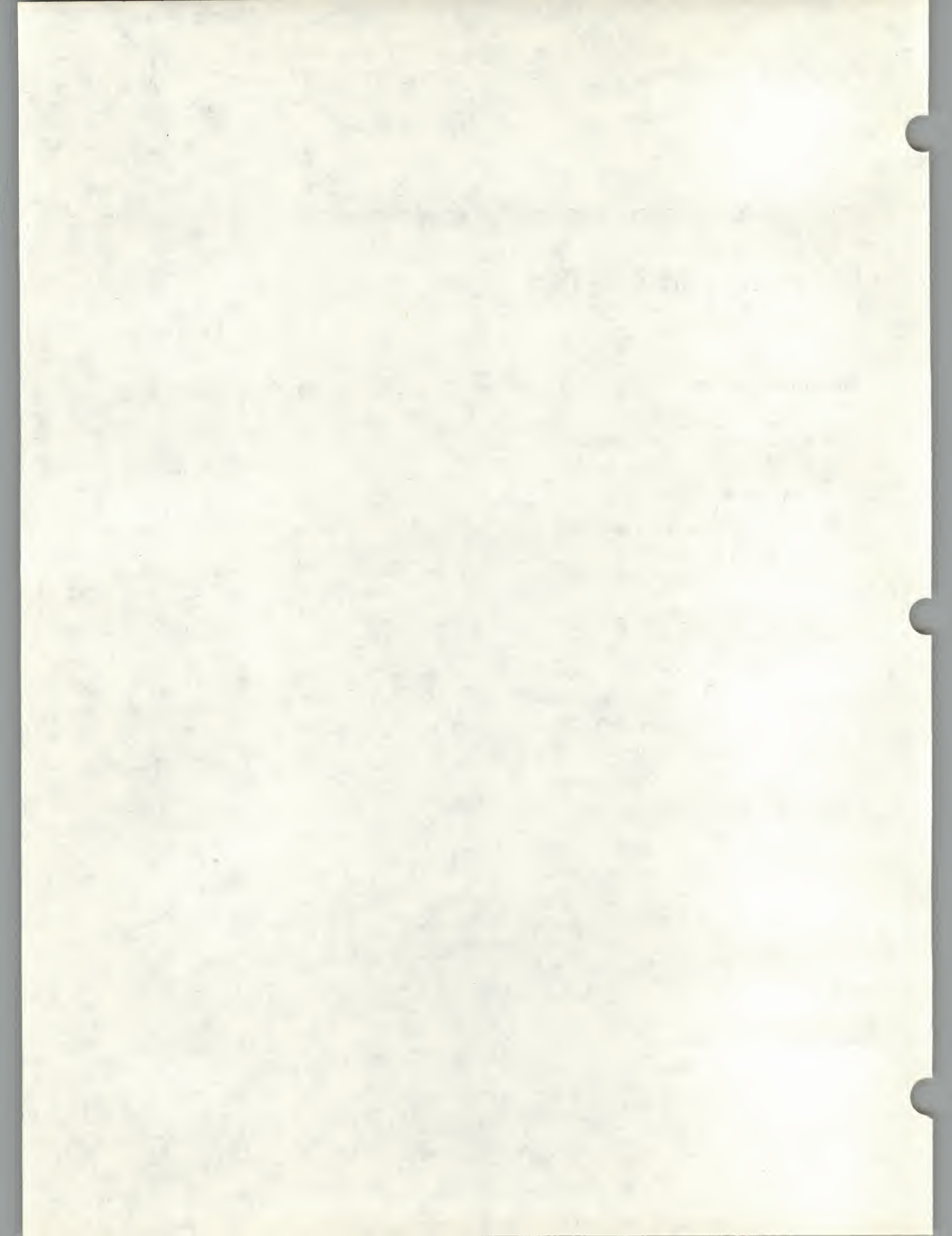


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## Power-Up and Self-Test

This chapter provides information about system power-up, self-tests associated with the CPU board, and LED interpretation. If this installation involves a software upgrade, read the software release manual to help you load the tape(s), set-up the new software, boot-up the system, and use the new features. If this is a new system, read *Installing the SunOS* to guide you through the tape loading and software set-up sequence.

### CAUTION

Read the installation manual that comes with the logic enclosure before plugging in the AC power cord. Make sure that you have followed all the precautions and procedures outlined in that document before applying power to the system.

### 4.1. Conventions Used in This Chapter

Anything printed in typewriter font in this text is a reproduction of a screen display. For Example:

Testing 8 megabytes of memory ... Completed.

Boldfaced text within that display means that you must enter that information exactly as shown. For example:

**>suntools**

Roman Italic font is used for titles or chapters within documents, and for notes.

*Installing the SunOS.*

Hexadecimal values in the text are preceded with 0x, and the leading zeros (in memory addresses, for example) are not shown:

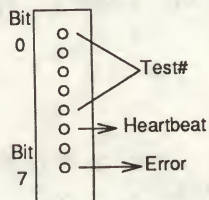
0x18.



## 4.2. Normal Power-up

For a normal power-up, the diagnostic switch (labelled DIAG/NORM) should be in the NORM position. In this mode, the monitor program performs a self-test of CPU functions that are necessary for program loading and execution (booting SunOS or running stand-alone diagnostic programs).

### Normal CPU Board LED Patterns



Upon power-up, the eight LEDs (located on the edge of the CPU board and visible from either the rear or top of the pedestal) all light briefly, then very rapidly flash a binary code to indicate which self-test is running. LEDs 0-4 indicate self-test patterns, LED 5 is the monitor heartbeat, LED 6 indicates an exception class error (such as a bus error trap or an unexpected interrupt), and LED 7 indicates a critical error. The illustration to the left of this text depicts the LEDs when the board is installed vertically.

After a successful self-test, the "monitor heartbeat" LED in bit position five pulses steadily to indicate that the CPU is receiving clock interrupts. At this point the monitor is in quiescent state and/or the operating system is in boot state. Once the operating system is running, the LEDs rapidly light in a converging pattern, and continue to do so as long as the CPU is processing or waiting to process instructions.

**NOTE** *The last self-test will consume a variable amount of time, dependent on the quantity of memory that is tested. The LEDs may appear to freeze when a large quantity of memory is tested.*

If any of the self-tests fail, LED 7 remains on while LEDs 0-4 freeze in a pattern that represents the failed test number. If LED 7 keeps repeating the pattern, there is a critical problem, and you should contact your Sun Customer Support Center. If possible, record the test pattern and provide this information to the Field Service Personnel solving the problem.

During a normal boot, the quantity of memory specified in the EEPROM is tested. During a diagnostic boot, all memory is automatically tested.

### Reading the CPU Board LED Table

The table on the following page provides a brief interpretation of the patterns displayed by the LED indicators on the edge of the CPU board.

The non-error condition for each test is represented by the solid and hollow bullet LED patterns. The error condition for each test is the same pattern but with LED #7 on. In many cases, the LED patterns cover a range of tests. To interpret the code for the individual tests shown in a grouping, please refer to the *PROM User's Manual* that comes with the software release you received with your system.







## Successful Self-tests

After a successful self-test, the system performs a non-interactive, automatic boot-up. The example below represents the sort of display that comes up on the console screen during an automatic boot following power-up. Values left blank will vary, depending on the unique characteristics of the workstation.

```
Selftest Completed.

Sun Workstation, Model Sun-4/300 Series
Type-4 keyboard
◆ ROM Rev __, __ MB memory installed, Serial # _____
  Ethernet address __:__:__:__:__

Testing __ megabytes of memory...Completed.
```

The display of the Sun banner (logo, workstation model number, and keyboard type) is a software selectable option that is determined by an EEPROM parameter.

The rotating diagonal symbol that appears after the Testing ....memory message means that the memory test is progressing normally. The quantity of memory tested during a normal boot is controlled by EEPROM programming.

A number of informative messages concerning the automatic boot-up process scroll by on the console screen while the operating system is booting. For example, the following messages appear during boot-up:

```
Autoboot in progress...
sd (0,0,0) vmunix
```

After the Autoboot in progress... message is displayed, a program checks to ensure file system integrity and attempts to repair any inconsistencies. If the program makes any repairs, they are listed in the message. This condition is most likely to occur if the system was powered down or is reset without using the /etc/halt command.

The sd(0,0,0) vmunix message indicates the type of device from which the SunOS is booting (the example above represents a SCSI disk based workstation). The controller, drive, and partition numbers are shown in parentheses. The word vmunix represents the Sun Operating System, which is booted automatically if you have not specified a particular file that you want booted. If you were booting from tape and specified a file after the parentheses, the name of that file would appear in place of vmunix.

Unless you abort the process and invoke the monitor program, you will receive a login prompt when the SunOS system is booted.



**Failure to Boot**

If an error is found during self-test, CPU board diagnostic LEDs (visible from the rear of the pedestal) freeze in a pattern that indicates which self-test failed.

**One of the bottom LEDs (Bit 6 or 7) always lights when an error occurs. In this case, THE SYSTEM WILL NOT BOOT-UP AND THE CONSOLE SCREEN MAY REMAIN DARK.** If this happens, record the pattern of the lighted LEDs as well as you can if the pattern is repeating.

At this point you may connect a terminal (set for 9600 baud, 8 data bits, 1 stop bit, and no parity) to Serial Port A, set the diagnostic switch to the DIAG position, and then reboot the system. In this mode, you may determine which, if any, self-test is failing.

**No Console Display**

If you have waited at least two minutes after power-up and nothing appears on the console screen, make sure that the monitor (CRT) is cabled correctly, and that AC power is switched ON.

If the monitor is connected to power and there is no display when you boot with the diagnostic switch on NORM, you may want to connect a terminal (set for 9600 baud, 8 data bits, 1 stop bit, and no parity) to Serial Port A, set the diagnostic switch to the DIAG position, and then power-cycle the system. In this mode, you may determine which (if any) self-test is failing.

**4.3. Diagnostic Mode**

The diagnostics switch, when set to the DIAG position, can be used to run the Boot PROM resident extended diagnostic tests, automatically boot an EEPROM-specified diagnostic, or examine and modify EEPROM values. The following section describes how to change specific EEPROM values. For more information about the other functions of the DIAG mode, refer to the *PROM User's Manual*.

**4.4. Setting EEPROM Values**

EEPROM values can be examined or modified using the PROM monitor program. To start the PROM monitor program using a terminal connected to Serial Port A, set the diagnostic switch to the DIAG position and press the BREAK key. If you are on a console screen, enter the PROM monitor program by pressing the **L1** key concurrently with the **a** key. You should now see the monitor prompt (>).

At this point you can use the PROM monitor program to make sure that certain EEPROM locations contain the correct values. The following sections explain how you can change your output display device and screen size. For more detailed information about EEPROM programming, refer to the *PROM User's Manual*.



## Changing Your Output Display Device

The EEPROM is usually programmed to support the display device shipped with your system. If you need to change your output device (for example, to run diagnostics on a terminal connected to serial port A), you will need to change the value at EEPROM location 0x01F. To do this, enter the following command:

q 1F **Return**

The monitor program will prompt you with the following message:

```
EEPROM 01F:<current value>?
```

In the table below, find the display device you are using and its corresponding EEPROM value.

| <i>EEPROM Value</i> | <i>Display Device</i>                                    |
|---------------------|----------------------------------------------------------|
| 0x00                | Monochrome (black and white) Monitor                     |
| 0x10                | Terminal Connected to Serial Port A                      |
| 0x11                | Terminal Connected to Serial Port B                      |
| 0x12                | Color Monitor (VME color board must be in system)        |
| 0x20                | Color or Monochrome Monitor (P4 board must be in system) |

If you want to change the current display device setting, enter the appropriate hexadecimal value from the table above. Next, enter any non-hexadecimal character (such as a period) and press **Return**. If you do not want to change the value, enter any non-hexadecimal character (such as a period) and press **Return**.

## Changing Your Screen Size

If you are using a monochrome monitor, you may need to change your screen size. To do this, enter the following command to ensure that the value at EEPROM location 0x016 contains the appropriate value for the screen size being used:

q 16 **Return**

The monitor program will prompt you with the following message:

```
EEPROM 016:<current value>?
```

In the table below, find the screen size you are using and its corresponding EEPROM value.

| <i>EEPROM Value</i> | <i>Screen Size</i> |
|---------------------|--------------------|
| 0x00                | 1152x900           |
| 0x12                | 1024x1024          |
| 0x13                | 1600x1280          |
| 0x14                | 1440x1440          |

If you want to change the current screen size value, enter the appropriate hexadecimal value from the table above. Next, enter any non-hexadecimal character (such as a period) and press **Return**. If you do not want to change the value, enter any non-hexadecimal character (such as a period) and press **Return**.



## High Resolution Monitor

If you are using a Sun-4 system with a high-resolution (1600 x 1280) monitor and Version 1.0 or later firmware, the screen should be set at 80 columns and 34 rows. Enter the following command(s) to ensure that the values at EEPROM locations 0x050 and 0x051 contain the appropriate values:

q 50 or q 51 **Return**

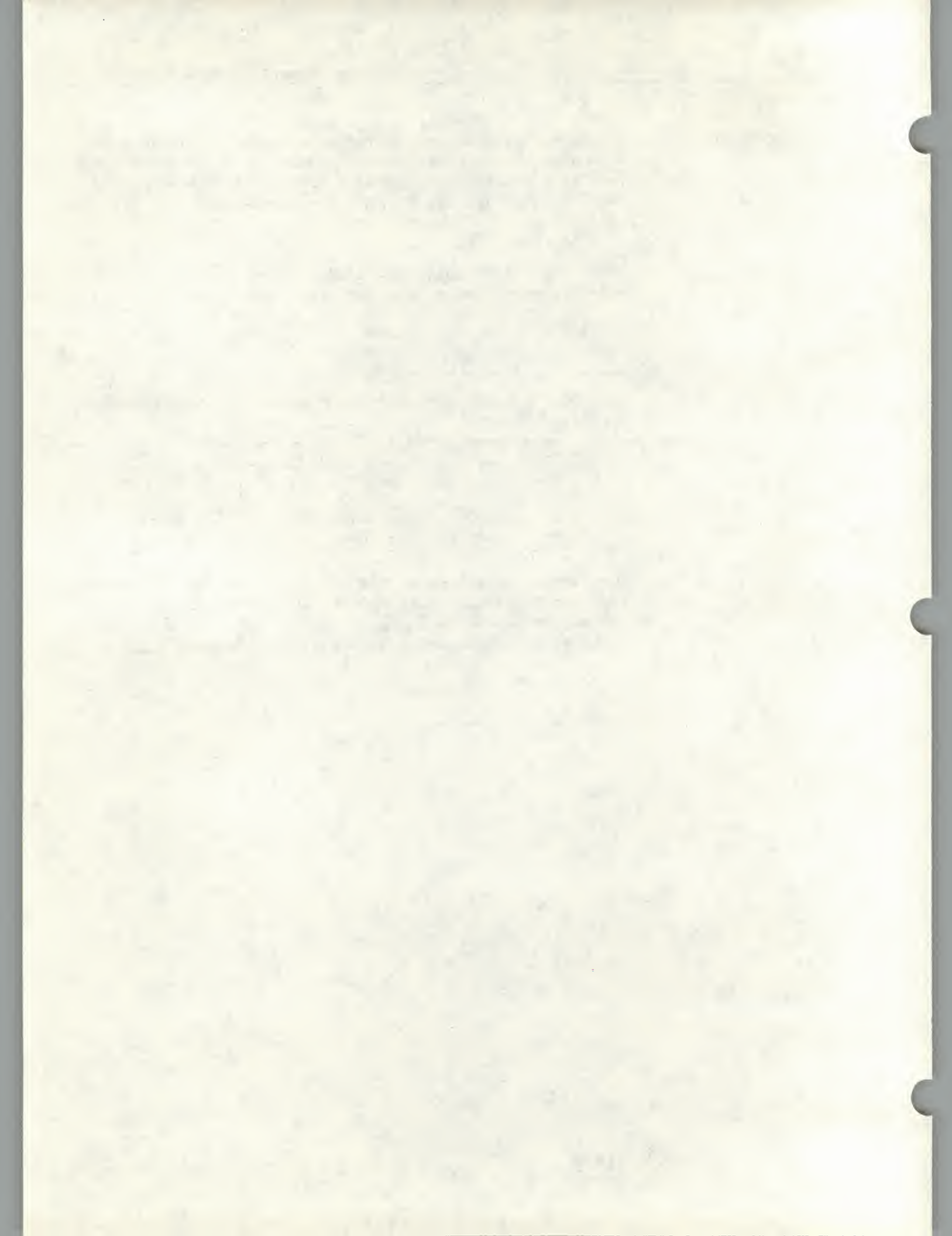
The monitor program will prompt you with the following message:

```
EEPROM 050:<current value>?
EEPROM 051:<current value>?
```

In the table below, find the screen settings you want to use and their corresponding EEPROM values.

| <i>Location</i> | <i>EEPROM Value</i> | <i>Setting</i> |
|-----------------|---------------------|----------------|
| 0x050           | 0x50                | 80 columns     |
| 0x050           | 0x78                | 120 columns    |
| 0x051           | 0x22                | 34 rows        |
| 0x051           | 0x30                | 48 rows        |

If you want to change the current screen settings, enter the appropriate hexadecimal value from the table above. Next, enter any non-hexadecimal character (such as a period) and press **Return**. If you do not want to change the value, enter any non-hexadecimal character (such as a period) and press **Return**.





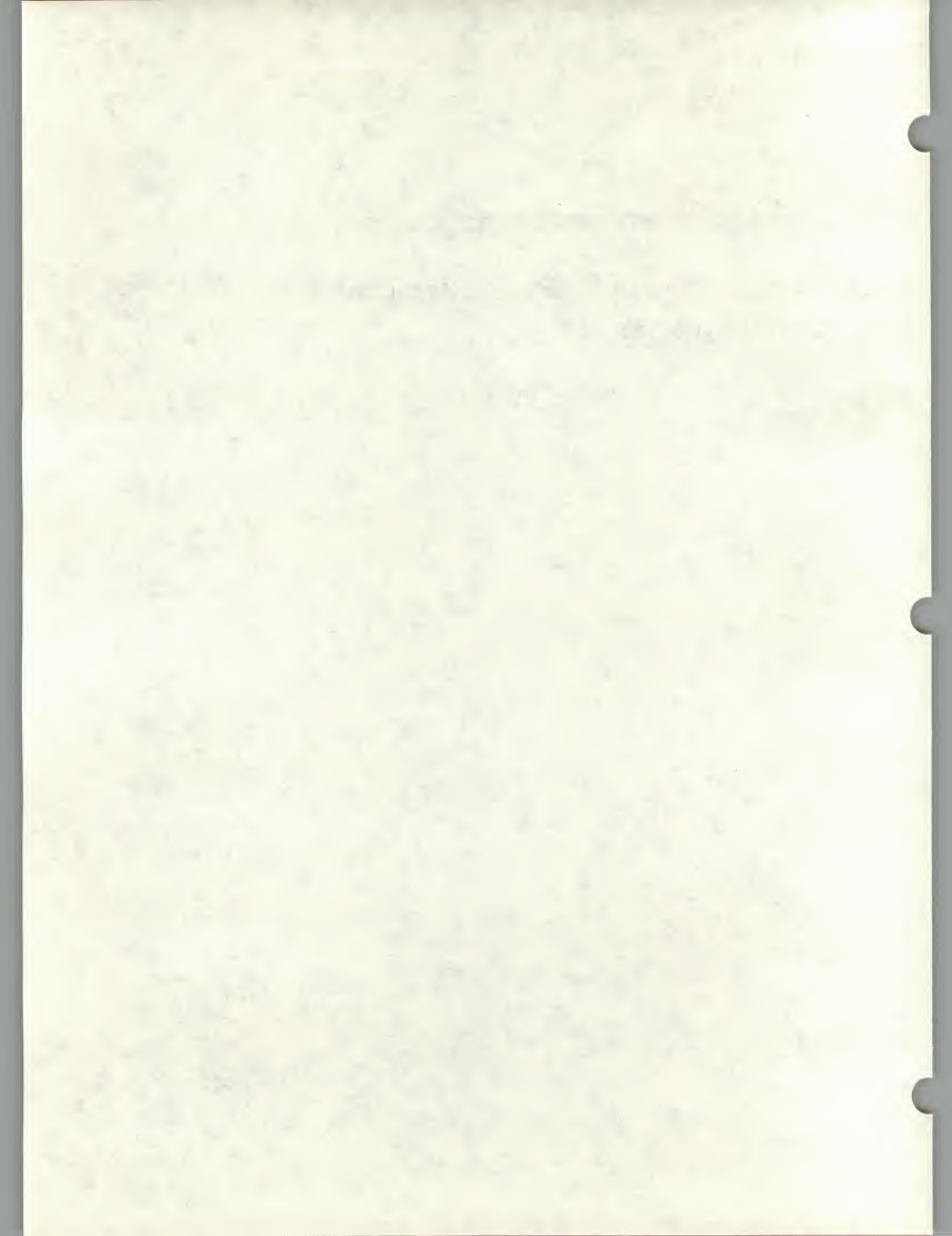
# A

---

## CPU Board Connector Pin Assignments and Serial Port Signals

|                                                                   |    |
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## CPU Board Connector Pin Assignments and Serial Port Signals

This appendix contains the pin assignments for the CPU board:

- Keyboard/Mouse Connector
- Serial Port(s)
- Ethernet Connector
- Small Computer Systems Interface (SCSI) Connector

It also contains a signal description of the serial ports.

**NOTE** *Only those pins actually connected to something are listed (open pins are not documented).*

Table A-1 *Pin Assignments: Keyboard/Mouse 8-Pin Round Connector*

| <i>Pin</i> | <i>Signal</i> | <i>Pin</i> | <i>Signal</i>        |
|------------|---------------|------------|----------------------|
| 1          | GND           | 5          | TXDA (keyboard)      |
| 2          | GND           | 6          | RXDA (keyboard)      |
| 3          | VCC           | 7          | TXDB (mouse) or GND† |
| 4          | RXDB (mouse)  | 8          | VCC                  |

NOTE: Pin 7 is set by a jumper on the CPU board. It is factory-configured to GND. See Appendix D for jumper information.

Table A-2 *Pin Assignments: Serial Port A*

| <i>Serial Port A</i> |        |     |        |
|----------------------|--------|-----|--------|
| Pin                  | Signal | Pin | Signal |
| 2                    | TXD    | 8   | DCD    |
| 3                    | RXD    | 15  | DB     |
| 4                    | RTS    | 17  | DD     |
| 5                    | CTS    | 20  | DTR    |
| 6                    | DSR    | 24  | DA     |
| 7                    | GND    | 25  | -5V    |

A EEPROM parameter may be used to inhibit the DTR and RTS signals (refer to the *Sun PROM Manual*).

Table A-3 *Pin Assignments: Serial Ports B, C, and D*

| <i>Serial Ports B,C, and D</i> |        |     |        |
|--------------------------------|--------|-----|--------|
| Pin                            | Signal | Pin | Signal |
| 1                              | DCD    | 5   | GND    |
| 2                              | RXD    | 6   | DSR    |
| 3                              | TXD    | 7   | RTS    |
| 4                              | DTR    | 8   | CTS    |
| 9                              | Unused |     |        |

Table A-4 *Pin Assignments: Ethernet Connector*

| <i>Ethernet</i> |                |     |        |
|-----------------|----------------|-----|--------|
| Pin             | Signal         | Pin | Signal |
| 1               | chassis ground |     |        |
| 2               | E.COL+         | 9   | E.COL- |
| 3               | E.TXD+         | 10  | E.TXD- |
| 4               | chassis ground |     |        |
| 5               | E.RXD+         | 12  | E.RXD- |
| 6               | GND            | 13  | +12V   |
| 7               | Unused         |     |        |



Table A-5 Mini-Micro SCSI Connector

| <i>Signal</i> | <i>Pin</i> | <i>Signal</i> | <i>Pin</i> |
|---------------|------------|---------------|------------|
| GND           | 1          | GND           | 2          |
| GND           | 3          | GND           | 4          |
| GND           | 5          | GND           | 6          |
| GND           | 7          | GND           | 8          |
| GND           | 9          | GND           | 10         |
| GND           | 11         | NO CONNECT    | 12         |
| NO CONNECT    | 13         | NO CONNECT    | 14         |
| GND           | 15         | GND           | 16         |
| GND           | 17         | GND           | 18         |
| GND           | 19         | GND           | 20         |
| GND           | 21         | GND           | 22         |
| GND           | 23         | GND           | 24         |
| GND           | 25         | -SD[00]       | 26         |
| -SD[01]       | 27         | -SD[02]       | 28         |
| -SD[03]       | 29         | -SD[04]       | 30         |
| -SD[05]       | 31         | -SD[06]       | 32         |
| -SD[07]       | 33         | -DP           | 34         |
| GND           | 35         | GND           | 36         |
| NO CONNECT    | 37         | TERM PWR      | 38         |
| NO CONNECT    | 39         | GND           | 40         |
| -ATN          | 41         | GND           | 42         |
| -BSY          | 43         | -ACK          | 44         |
| -RST          | 45         | -MSG          | 46         |
| -SEL          | 47         | -CD           | 48         |
| -REQ          | 49         | -IO           | 50         |



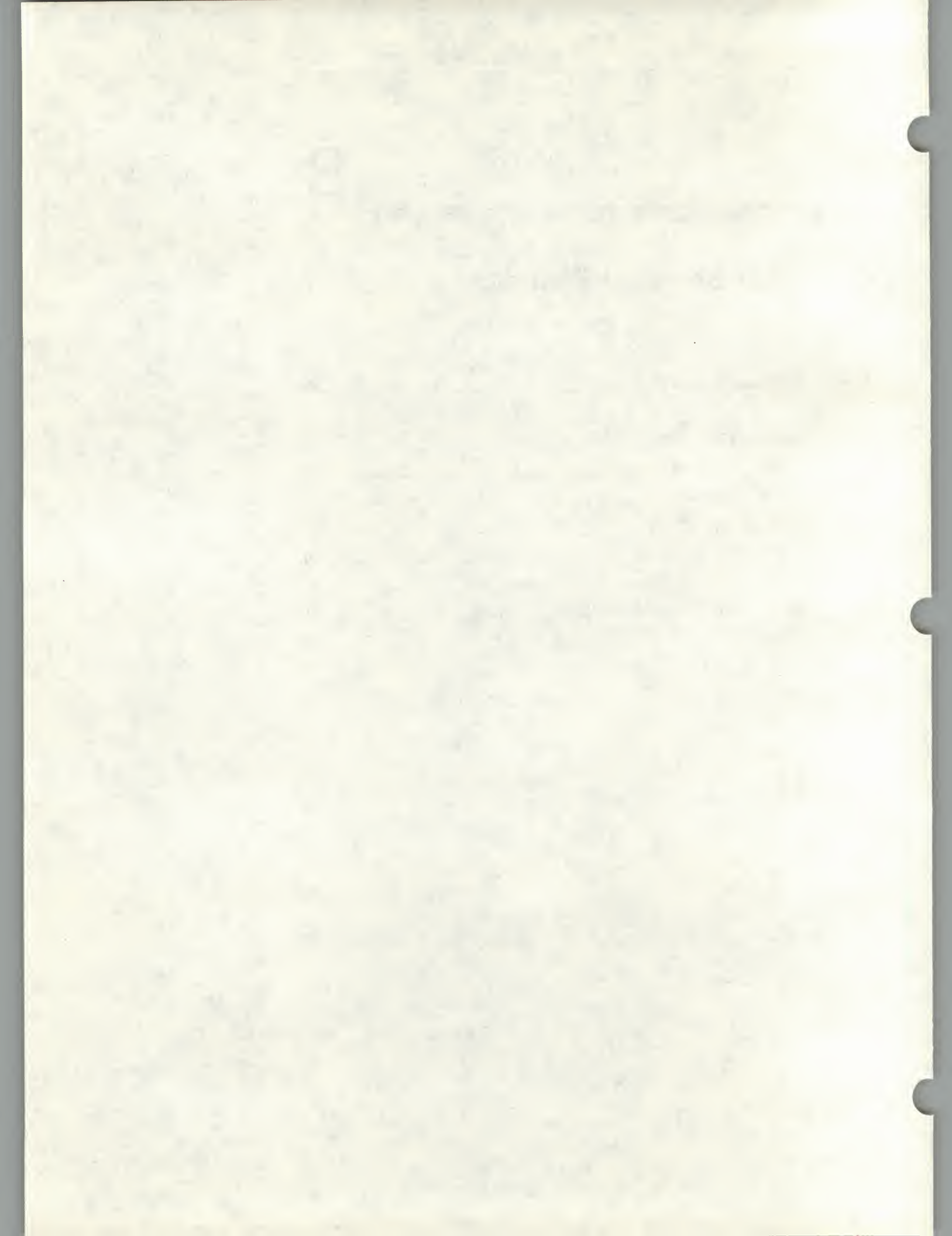


# B

## Customer Service Repairs

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# B

## Customer Service Repairs

Before sending in your CPU board for repair or replacement, you will need to remove the ID PROM. If you purchased the optional Data Ciphering Protocol (DCP) Processor, you will need to remove that chip also.

**NOT** removing these items may greatly increase the repair time of your board.

### B.1. Workstation Power-Down

Use the following steps to power-down the workstation:

1. Move to the root (super user) level on the system.
2. Either you or the system administrator should warn clients or other users that the system is about to be powered down.
3. Enter the following commands:

```
# sync
# sync
# /etc/halt or
# /etc/shutdown
```

This procedure ensures that any data in the buffers is written to disk before the operating system is halted.

4. Turn off the system.

#### CAUTION

Do not disconnect the power cord from the logic enclosure's power outlet. Connection to the power outlet provides the grounding necessary for the anti-static strap to work properly.

### Attaching the Wrist Strap

The anti-static wrist strap should be attached to your wrist and to a bare-metal portion of the logic enclosure chassis before handling the CPU board or any of the chips. Permanent damage to the chips could occur if you fail to do so.



**NOTE** *The "ESD Kit" contains an anti-static wrist strap and anti-static mat and is provided only with options and upgrades shipped separately from your original system. If you do not have an "ESD Kit" to use when de-installing a board or component, be aware that electro static discharge is built up when you walk across a carpet and then touch the board. It is recommended that you de-install your system on a non-carpeted surface.*

## CPU Board Removal

To remove the CPU board, first remove all cables and connectors from the back panel. Then use the following procedures to extract the Sun CPU board:

1. Remove the 2mm hex-head machine screws from the rear panel.
2. Place the anti-static mat nearby on a flat surface with the shiny side down.
3. Push the board extraction levers outward to detach the board from the card-cage.
4. Grasp the board extraction levers, and pull straight up on the back panel to get the board set out of the enclosure and onto the anti-static mat.

**NOTE** *If the P4 card is present, you will have to remove four screws from the rear panel rather than two.*

## B.2. Removing the ID PROM

1. The ID PROM can be identified by the numbers "27S19" etched on the component surface. It is located at coordinate A4-A7 on the CPU board. Illustrations have been provided in Appendix D to aid in identifying specific components.

**The ID PROM contains the workstation's unique Ethernet address and serial number, so it must stay with the workstation.**

2. Use a small flat screwdriver to gently pry both ends of the component in equal amounts, alternating between ends as you work the component off. Do not pry one end off first, as you will bend the pins on the other end.

## Replacing the ID PROM

When replacing the ID PROM on the CPU board, ensure that the "V-shaped" cut in the chip is facing the same direction as the other chips on the board. Replacing the ID PROM backwards will destroy the PROM.

To insert the ID PROM, hold the chip by its edges, gently lower the pins into the socket, and then push firmly until the bottom of the chip is flush with the socket face.

## Removing the Data Ciphering Protocol Processor

If you have the optional DCP chip, you will need to remove the processor. It should be removed in the same manner as the ID PROM. The processor is located at coordinate B4-C2 and is etched with "9518".



**Sending the CPU Board in for Repair**

For specific packing and mailing instructions, please call the nearest Sun Representative.





# C

## Power Consumption Table

|                               |    |
|-------------------------------|----|
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|-------------------------------|----|



2

of the [illegible] [illegible]

[illegible]



## Power Consumption Table

Table C-1 *Typical Sun 4300 CPU Board Power Consumption*

| <i>Configuration</i><br>(CPU+P4 frame buffer) | <i>@ +5V</i> | <i>@ -5.2V</i> | <i>@ +12V</i> | <i>@ -12V</i> | <i>Total Watts</i> |
|-----------------------------------------------|--------------|----------------|---------------|---------------|--------------------|
| CPU (no frame buffer)                         | 20.1         | 0.01           | 0.71          | 0.21          | 111.6              |
| CPU+MG4                                       | 23.36        | 0.01           | 0.71          | 0.21          | 127.9              |
| CPU+CG6                                       | 24.72        | 0.01           | 0.71          | 0.21          | 134.7              |

NOTES: CPU measurement includes:

1. Backplane 2A @ 5V
2. Sun-4 Keyboard/mouse 0.6A @ 5V
3. Ethernet transceiver 0.5A @ +12V





# D

---

## Jumper Configurations for the 4300 CPU Board

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# D

## Jumper Configurations for the 4300 CPU Board

### D.1. Introduction

This section contains the board layout and jumper configurations for the 4300 CPU. As the scope of this appendix is limited to these specific jumper configurations and locations, refer to the logic enclosure installation manual for instructions on how to access the board, and read the "Board Installation and Extraction" chapter in this manual for instructions on how to remove the CPU board.

For information about backplane jumper access, refer to the logic enclosure installation manual. For information about backplane jumper configuration, refer to the Cardcage Slot Assignments manual.

### D.2. CPU Board Layout

Figures D-1 and D-2 depict the sections of the CPU board where jumper-blocks are located and points out some of the major components.

#### How to Find Components

CPU board components are referenced by a combination of two-letter coordinates. A grid of one-inch squares divides the board, and letters define both the X and Y coordinates of the grid. Each letter occupies a half-inch square, demarcated by dotted lines. To find the component at C5-H0, read the first coordinate (C5) along the X axis to the dotted line before letter C. This is C0. Position C5 is halfway between the dotted lines. Read up along the Y axis to the dotted line before H. That is H0. The jumper block is at the intersection.



Figure D-1 *A-G Section of the 4300 CPU Board*

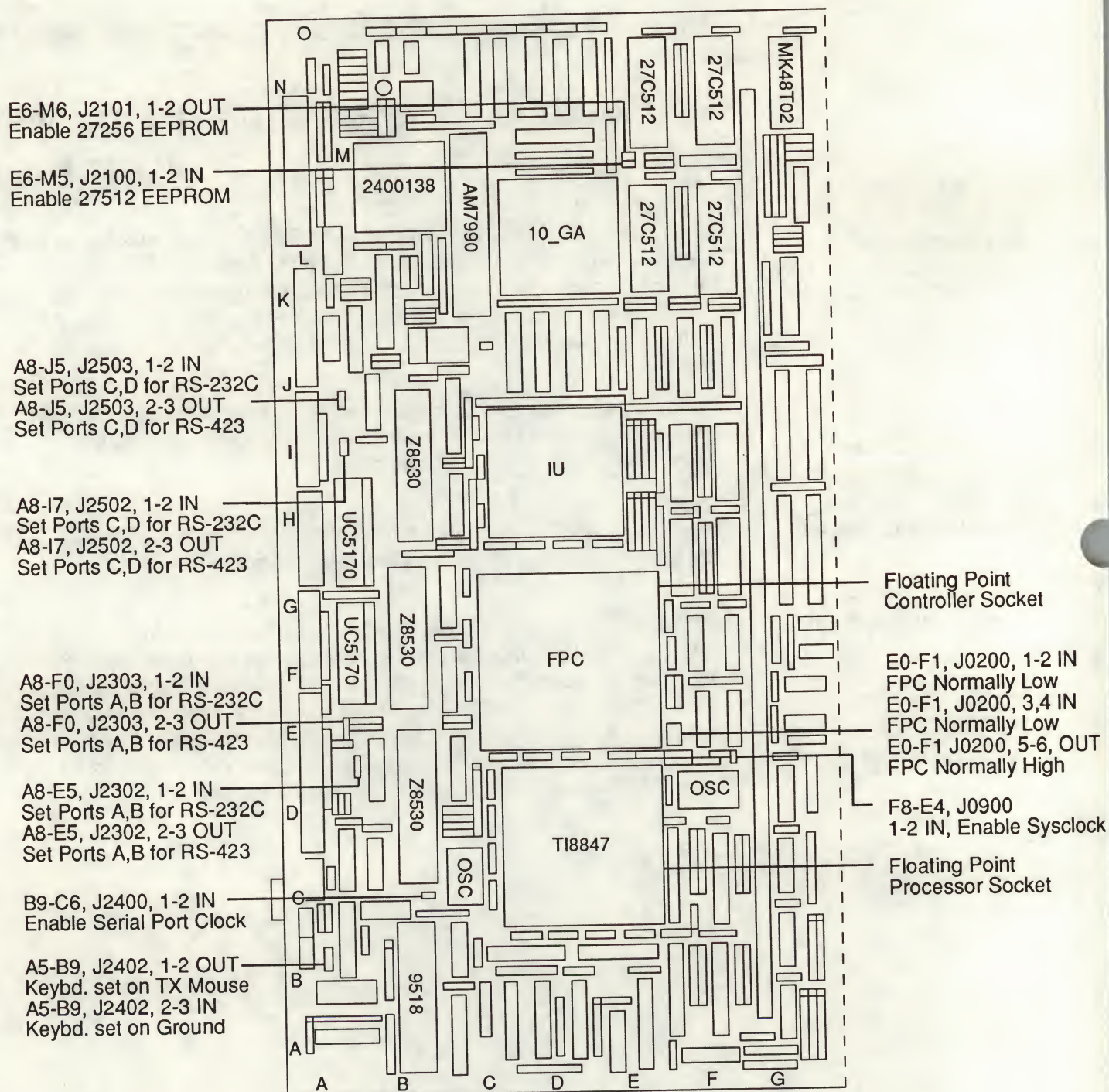
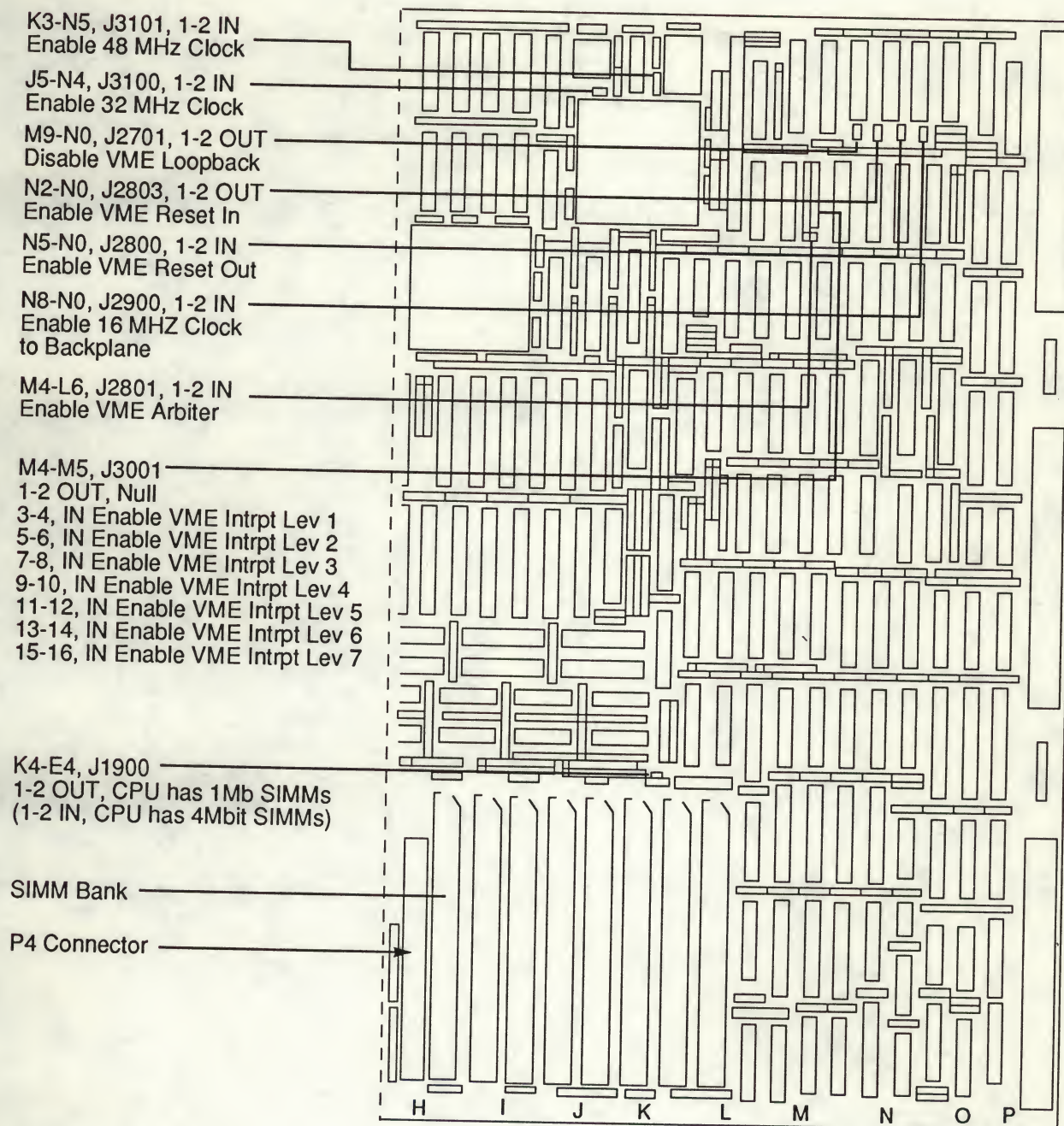




Figure D-2 *H-P Section of the 4300 CPU Board*

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### D.3. Jumper Configurations

The table on the following page shows the factory configuration of jumper-blocks of the Sun 4300 CPU board and lists coordinates that aid in locating them.

The *Configuration* column on the table indicates whether or not the board is shipped with the referenced jumper installed on the indicated pins. "1-2" in that column means that the jumper is installed across pins 1 and 2. "IN" means that the board is shipped with the jumper installed. "OUT" means that the jumper is not installed at the factory.

To locate pin 1 on any jumper block, find the square pin on the component (top) side of the board.

The fourth column, *Description*, describes the function of the jumper when it is installed in the indicated position.



Table D-1 *Factory Configuration of Jumpers on the 4300 CPU Board*

| <i>Jumper</i> | <i>Location</i> | <i>Label</i> | <i>Configuration</i> | <i>Description</i>                 |
|---------------|-----------------|--------------|----------------------|------------------------------------|
| J0200         | E0-F1           | T47          | 1-2, IN              | FPC Normally Low                   |
| J0200         | E0-F1           | TIPR         | 3-4, IN              | FPC Normally Low                   |
| J0200         | E0-F1           | CHN          | 5-6, OUT             | FPC Normally High                  |
| J0300         | J5-J9           | DVMA.REQW    | 1, OUT               | Test point                         |
| J0300         | J5-J9           | DVMA.REQR    | 2, OUT               | Test point                         |
| J0900         | F8-E4           | 4XCLK        | 1-2, IN              | Enable Sysclock                    |
| J0901         | F7-E5           |              | 1                    | No Connection                      |
| J0901         | F7-E5           | GND          | 2, OUT               | Manufacturing clock injection      |
| J1900         | K4-E4           | 4MEG         | 1-2, OUT             | CPU has 4 Mbyte SIMMs              |
| J1900         | K4-E4           | 1MEG         | 1-2, IN              | CPU has 1 Mbyte SIMMs              |
| J2001         | H0-K0           | MHOLDA       | 1, OUT               | Test point                         |
| J2001         | H0-K0           | FHOLD        | 2, OUT               | Test point                         |
| J2002         | C7-K0           | NULL.CYC     | 1, OUT               | Test point                         |
| J2002         | C7-K0           | F.NULL.CYC   | 2, OUT               | Test point                         |
| J2100         | E6-M5           | E512         | 1-2, IN              | Enable 27512 EPROM                 |
| J2101         | E6-M6           | E256         | 1-2, OUT             | Enable 27256 EPROM                 |
| J2302         | A8-E5           | AB232        | 1-2, IN              | Set Ports A,B for RS-232C, +/- 12V |
| J2303         | A8-F0           | AB232        | 1-2, IN              | Set Ports A,B for RS-232C, +/- 12V |
| J2302         | A8-E5           | AB423        | 2-3, OUT             | Set Ports A,B for RS-423, +/- 5V   |
| J2303         | A8-F0           | AB423        | 2-3, OUT             | Set Ports A,B for RS-423, +/- 5V   |
| J2400         | B9-C6           | SERCLK       | 1-2, IN              | Enable Serial Port Clock           |
| J2402         | A5-B9           | TXMSE        | 1-2, OUT             | Keyboard Set On Transmit Mouse     |
| J2402         | A5-B9           | GD           | 2-3, IN              | Keyboard Set On Ground             |
| J2502         | A8-I7           | CD232        | 1-2, IN              | Set Ports C,D for RS-232C, +/- 12V |
| J2503         | A8-J5           | CD232        | 1-2, IN              | Set Ports C,D for RS-232C, +/- 12V |
| J2502         | A8-I7           | CD423        | 2-3, OUT             | Set Ports C,D for RS-423, +/- 5V   |
| J2503         | A8-J5           | CD423        | 2-3, OUT             | Set Ports C,D for RS-423, +/- 5V   |
| J2701         | M9-N0           | LOOP         | 1-2, OUT             | Disable VME Loopback               |
| J2800         | N5-N0           | RSTO         | 1-2, IN              | Enable VME Reset Out               |
| J2801         | M4-L6           | ARB          | 1-2, IN              | Enable VME Arbiter                 |
| J2803         | N2-N0           | RSTI         | 1-2, OUT             | Enable VME Reset IN                |
| J2900         | N8-N0           | VMCK         | 1-2, IN              | Enable 16 MHz Clock to Backplane   |
| J3001         | M4-M5           |              | 1-2, OUT             | Null                               |
| J3001         | M4-M5           | INT1         | 3-4, IN              | Enable VME Interrupt Level 1       |
| J3001         | M4-M5           | INT2         | 5-6, IN              | Enable VME Interrupt Level 2       |
| J3001         | M4-M5           | INT3         | 7-8, IN              | Enable VME Interrupt Level 3       |
| J3001         | M4-M5           | INT4         | 9-10, IN             | Enable VME Interrupt Level 4       |
| J3001         | M4-M5           | INT5         | 11-12, IN            | Enable VME Interrupt Level 5       |
| J3001         | M4-M5           | INT6         | 13-14, IN            | Enable VME Interrupt Level 6       |
| J3001         | M4-M5           | INT7         | 15-16, IN            | Enable VME Interrupt Level 7       |
| J3100         | J5-N4           | 32MHZ        | 1-2, IN              | Enable 32 MHz Clock                |
| J3101         | K3-N5           | 48MHZ        | 1-2, IN              | Enable 48 MHz Clock                |





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## Revision History

| Dash | Revision | Date              | Comments                                    |
|------|----------|-------------------|---------------------------------------------|
| 01   | 01       | 23 August 1988    | First Draft of this Installation Procedure. |
| 01   | 02       | 30 August 1988    | Second Draft.                               |
| 02   | 03       | 21 September 1988 | Alpha Review Draft.                         |
| 02   | 04       | 24 October 1988   | Review Draft.                               |
| 03   | 50       | 1 November 1988   | Engineering Release of Beta Review Draft.   |
| 04   | 50       | 15 December 1988  | Engineering Release of Beta Review Draft.   |
| 10   | A        | 17 April 1989     | First Customer Release                      |





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We who work at Sun Microsystems wish to provide the best possible documentation for our products. To this end, we solicit your comments on the *Sun 4300 CPU Board Installation Manual*, Part Number 800-3119-10. We would appreciate your telling us about errors in the content of the manual, and about any material that you feel should be there but isn't.

### Typographical Errors

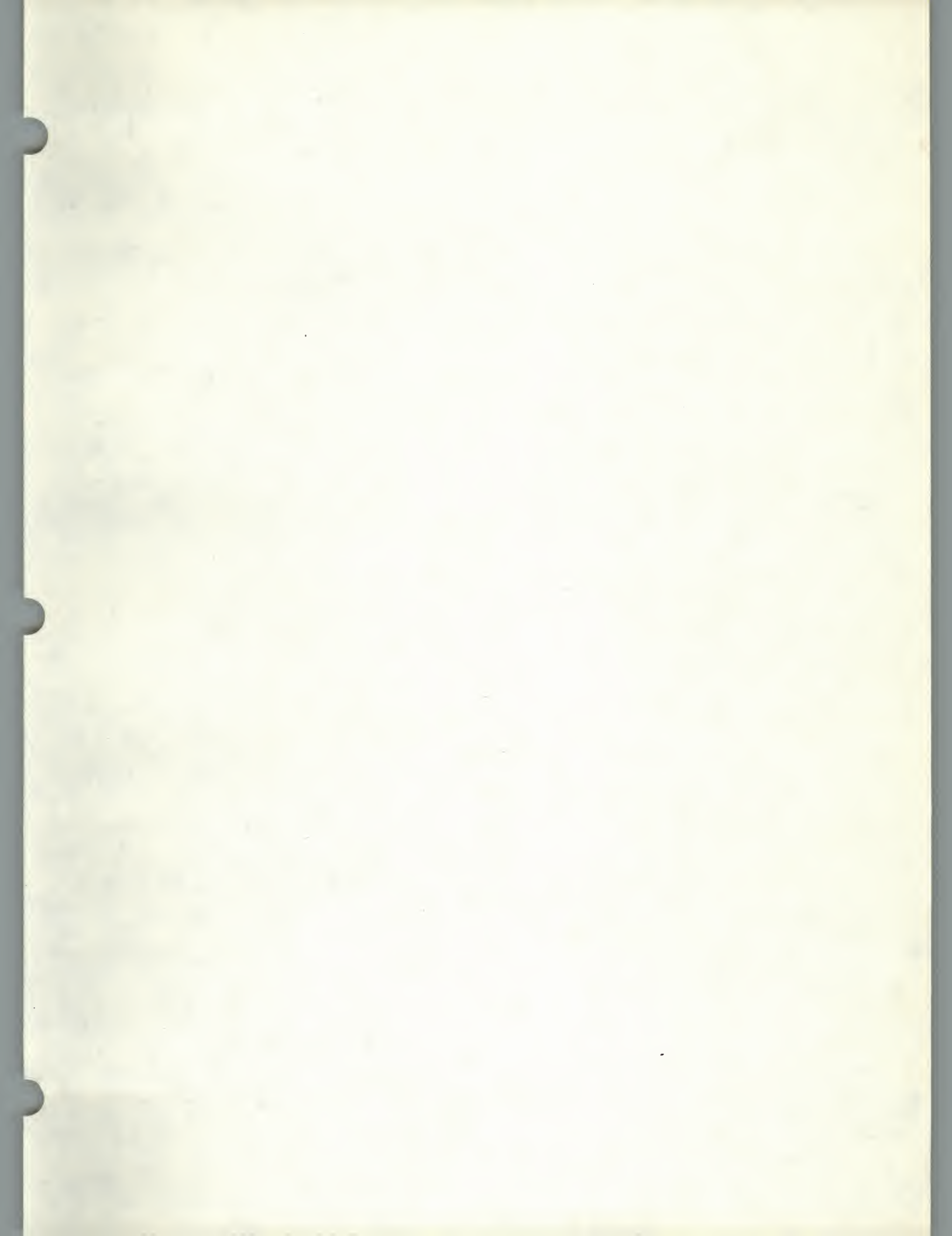
Please list typographical errors by page number and actual text of the error.

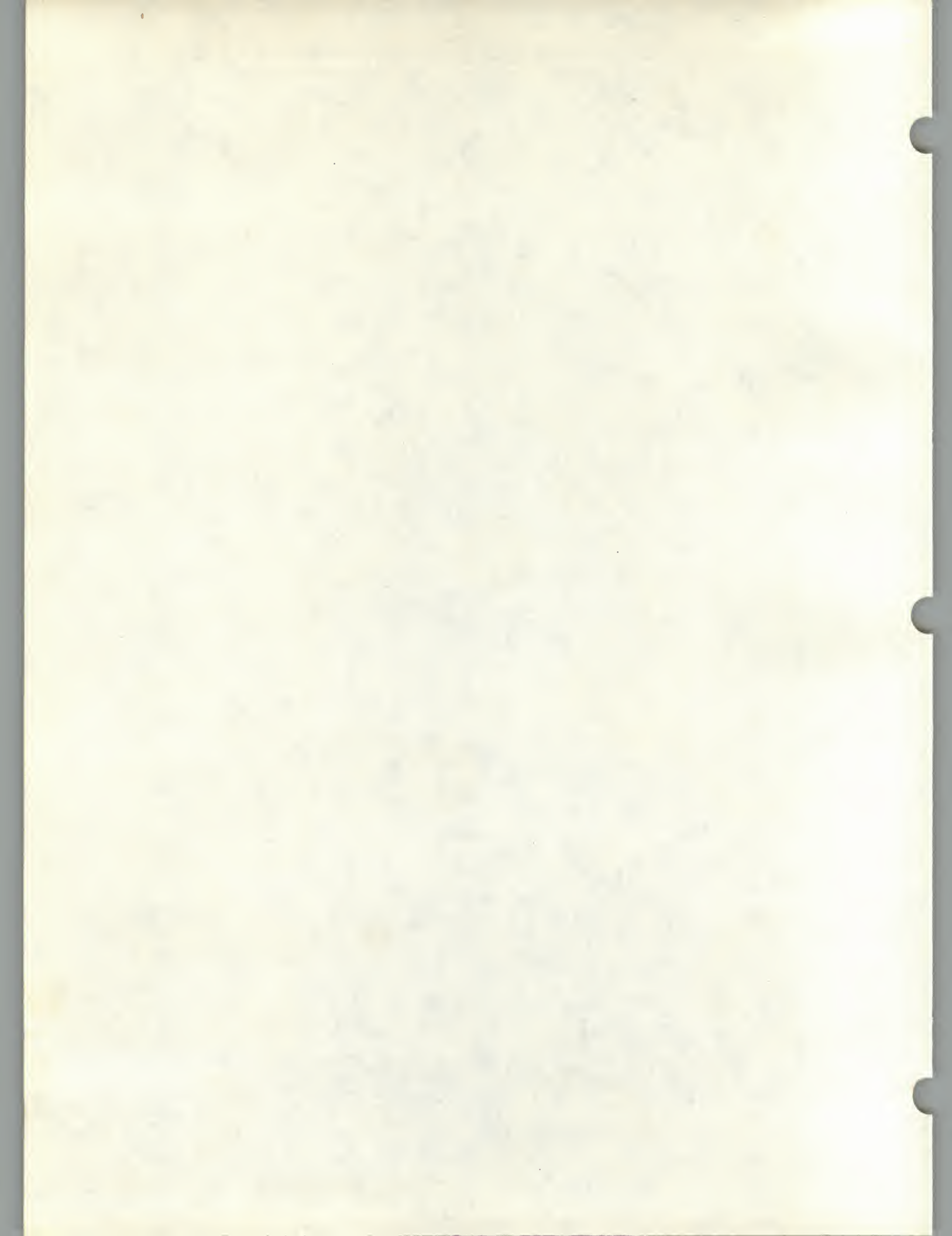
### Technical Errors

Please list errors in technical accuracy by page number and actual text of the error.

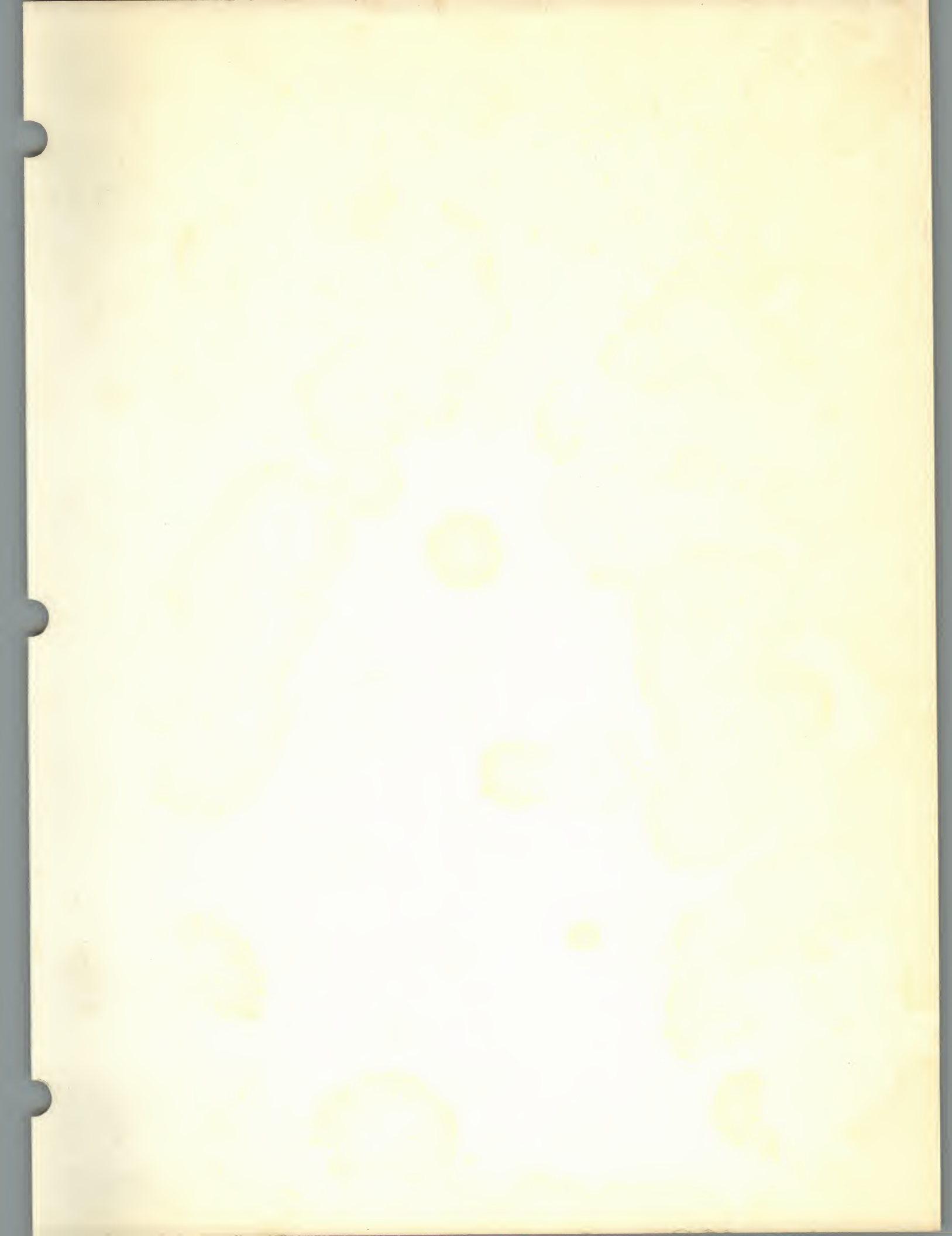












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